

What is claimed is:

1. A tubeless pneumatic tire comprising:

a carcass comprising a plurality of carcass plies stacked one on the other, radially of the tire, each of said carcass plies having a carcass cord web and topping rubber layers unified with the carcass cord web on opposite sides thereof by calendering, said plurality of carcass plies including an innermost carcass ply extending from the tread portion through the sidewall portion to the bead portion and turned up around the bead core outwardly from the inside of the tire in the axial direction, and an outer carcass ply extending from the tread portion through the sidewall portion to the bead portion and turned up around the bead core inwardly from the outside of the tire axis in the axial direction so as to cover the turned-up portion of the innermost carcass ply; and

an inner liner formed of a butyl-based rubber and covering a radially innermost topping rubber layer, wherein

the topping rubber layer of an interior subrace of the innermost carcass ply is formed of a butyl-based rubber, and

the topping rubber layers other than the topping rubber layer defining the interior surface of the innermost carcass ply are formed of a diene-based rubber material.

2. The tubeless pneumatic tire as set forth in claim 1, wherein

the innermost carcass ply is divided into two separate carcass ply portions, which are respectively disposed in regions corresponding to opposite sidewall portions.

3. The tubeless pneumatic tire as set forth in claim 1, wherein

W_n is the axial width between the radially outer ends of the two separate carcass ply portions and W_b is a tread width, and

W_n and W_b satisfy the relationship

$$0.2 W_b \leq W_n \leq 0.95 W_b.$$

4. The tubeless pneumatic tire as set forth in claim 1, wherein

the butyl-based rubber includes a butyl rubber or a derivative thereof as the main ingredient in an amount of not less than 60% by weight.

5. The tubeless pneumatic tire as set forth in claim 1, wherein

a rubber gage Y between the carcass cord web and the interior surface of the tire ranges from 0.8 to 2.5 mm.

6. A method of manufacturing a tubeless pneumatic tire comprising the steps of:

forming a carcass ply structure including

forming an inner carcass ply having a butyl-based topping rubber layer on a first surface thereof by calendering a butyl-based rubber into an inner carcass cord web thereof,

forming at least one outer carcass ply having an outer carcass cord web and topping rubber layers unified with the outer carcass web on opposite sides thereof by calendering,

winding said inner carcass ply about a forming drum, said first surface interfacing therewith to form the interior surface of the tire, and

winding said at least one outer carcass ply about said inner carcass ply;

assembling a tire blank, said tire blank including a tread portion, said carcass ply structure, a pair of opposite sidewall portions, and a pair of bead portions each having a bead core therein, one of said pair of bead cores being provided at each axial end portion of said carcass ply structure and being turned up around outwardly from the inside of the tire in the axial direction by at least one of

the axial end portions of said inner carcass ply and the axial end portions of said at least one of said outer carcass plies; and

molding the tire blank within a molding press, wherein

the topping rubber layers of said at least one outer carcass ply are formed of a diene-based rubber material.

7. The method as set forth in claim 6, wherein
said inner carcass ply is divided into two separate
carcass ply portions, which are respectively disposed in regions
corresponding to said opposite sidewall portions.

8. The method as set forth in claim 7, wherein
 W_n is the axial width between the radially outer ends of
the two separate carcass ply portions and W_b is a tread width,
and
 W_n and W_b satisfy the relationship
 $0.2 W_b \leq W_n \leq 0.95 W_b$.

9. The method as set forth in claim 6, wherein
the butyl-based rubber includes a butyl rubber or a
derivative thereof as the main ingredient in an amount of not
less than 60% by weight.

10. The method as set forth in claim 6, wherein
a rubber gage Y between the inner carcass cord web and the
interior surface of the tire ranges from 0.8 to 2.5 mm.

11. The method as set forth in claim 6, wherein said tire
blank further includes a pair of bead apexes.--